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Primary care

Randomised controlled trial of pelvic floor muscle training during pregnancy

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Abstract

Objectives To examine a possible effect on labour of training the muscles of the pelvic floor during pregnancy.
Design Randomised controlled trial.
Setting Trondheim University Hospital and three outpatient physiotherapy clinics in a primary care setting.
Participants 301 healthy nulliparous women randomly allocated to a training group (148) or a control group (153).
Intervention A structured training programme with exercises for the pelvic floor muscles between the 20th and 36th week of pregnancy.
Main outcome measures Duration of the second stage of labour and number of deliveries lasting longer than 60 minutes of active pushing among women with spontaneous start of labour after 37 weeks of pregnancy with a singleton fetus in cephalic position.
Results Women randomised to pelvic floor muscle training had a lower rate of prolonged second stage labour (24%, 95% confidence interval 16% to 33%; 22 out of 105 women were at risk (undelivered) at 60 minutes in the survival analysis) than women allocated to no training (38% (37/109), 28% to 47%). The duration of the second stage was not significantly shorter (40 minutes *v* 45 minutes, P = 0. 06).
Conclusions A structured training programme for the pelvic floor muscles is associated with fewer cases of active pushing in the second stage of labour lasting longer than 60 minutes.

Introduction

Training the pelvic floor muscles during pregnancy can prevent urinary incontinence,[1 2] and pregnant women are encouraged to do exercises for these muscles. A myth prevails among birth attendants that strong pelvic floor muscles (for example, as a result of horse riding) may obstruct labour.[3] However, training of the pelvic floor muscles may produce strong and well controlled muscles that will facilitate labour.[4] A prospective study with 86 women found no effect of such training on the course of delivery,[5] but possible effects of pelvic floor muscle training on labour have been sparsely scientifically documented.

The primary aim of this trial was to assess if training the muscles of the pelvic floor during pregnancy could prevent urinary incontinence. Women in the study group had stronger pelvic floor muscles and reported less urinary incontinence after the training period.[2] This report deals with secondary outcomes of the trial. We wanted to study any effect of pelvic floor muscle training on labour.

Methods

The population and methods are described elsewhere.[2] One group of women (n = 148) trained with a physiotherapist for 60 minutes once per week for a period of 12 weeks between the 20th and 36th week of pregnancy. In addition, the women were encouraged to perform eight to 12 intensive contractions of the pelvic floor muscle at home twice a day. Adherence to the training programme was 81% (120 women).[2] Women in the control group (n = 153) were not discouraged from doing pelvic floor muscle exercises on their own. Figure 1 shows the flow of participants through the trial.

We reviewed hospital records two to three years after delivery and recorded mode of delivery, epidural analgesia or oxytocin augmentation during labour, episiotomy, perineal tears, and neonatal outcomes. The reviewer (KÅS) was not involved in training the women and was blinded to group allocation while recording and plotting the data. The midwife in charge of labour judged the need for oxytocin augmentation or episiotomy. The obstetrician on call decided the need for operative delivery. Birth attendants were unaware of women's group status.

We recorded the lengths of the first and second stages of labour from partograms. We defined the onset of labour as the beginning of the active phase of the first stage of labour,[6] or from the time of admission if the cervix was dilated more than 3 cm on arrival. Our definition of the second stage of labour was "active pushing time." We recorded the lengths of the first and second stages of labour in minutes. Most clinics have rules that limit the duration of the second stage.[6] In Norway, the recommended "second stage rule" is one hour, with active pushing after complete dilatation of the cervix.[7] In this study we defined prolonged second stage as active pushing for longer than 60 minutes.

We undertook our analysis by intention to treat. It was restricted to 111 women in the training group and 113 women in the control group (fig 1). They had spontaneous start of labour after 37 weeks of pregnancy with a singleton fetus in cephalic position.

We used a Kaplan-Meier survival analysis to test for differences between groups in proportions of women with prolonged second stage and the duration of labour. We censored operative deliveries and deliveries with a prolonged second stage. We also performed a Cox regression analysis with possible confounding variables and appropriate statistical tests for categorical and normally distributed variables. We considered P values < 0.05 significant.

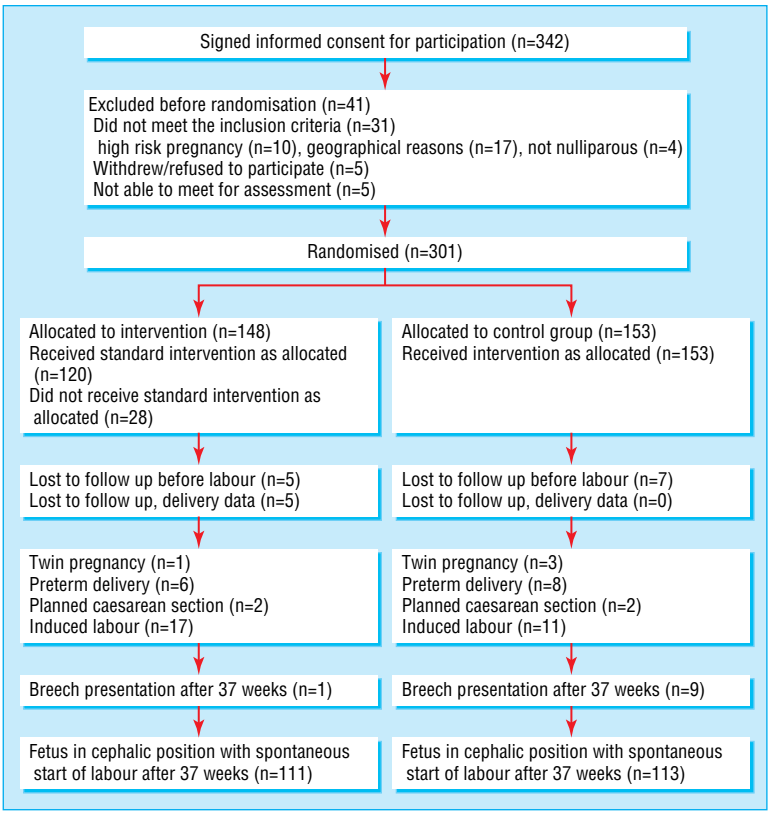

Fig 1 Flow of participants through the trial

Results

Women randomised to pelvic floor muscle training had a lower rate of prolonged second stage labour than women allocated to no training (table). The number needed to treat (NNT) to benefit was 8. In a survival analysis the difference between groups was 24% (95% confidence interval 16% to 33%) for the training group versus 38% (28% to 47%) for the control group.

The duration of the second stage of labour was not statistically different between groups (40 min *v* 45 min, P = 0.06). Figure 2 shows the time to delivery from the start of active pushing up to 60 minutes. The infants in the training group were slightly younger and smaller (table). A Cox regression analysis with gestational length, birth weight, and head circumference as possible confounders did not change the estimates materially.

Fewer women had breech presentations (fig 1; 1 *v* 9, P = 0.01). The rates of operative delivery for prolonged second stage did not differ between the two groups (table 1). Fewer women had episiotomies (51% *v* 64%, odds ratio 0.59, 0.35 to 1.00; NNT 7), but we found no other significant differences in outcomes related to labour. Apgar scores and umbilical artery pH did not differ between groups (data not shown).

Discussion

Pelvic floor muscle training during pregnancy results in improved muscle control and strong flexible muscles. The effect may be on the central nervous system and the muscles, and training seems to facilitate rather than obstruct labour.

Possible limitation of the study

Since this report deals with secondary outcomes and the differences reached borderline significance, the results should be viewed with caution. However, this was a randomised controlled trial with blinding technique, few withdrawals, and high adherence to the training protocol.

Mean outcome variables (with standard deviations) among 224 women with a singleton fetus in cephalic position with spontaneous start of labour after 37 weeks of pregnancy. Values are numbers (percentages) of women unless otherwise indicated

	Study group (n=111)	Control group (n=113)	P value
Median duration of first stage of labour in minutes (95% CI)	260 (195 to 325)	259 (215 to 303)	0.44*
Acute caesarean section in the first stage	5 (5)	3 (3)	0.46†
Duration of second stage of labour in minutes (95% CI)	40 (33 to 47)	45 (38 to 52)	0.06*
Deliveries with prolonged second stage (≥60 minutes)	22 (21)	37 (34)	0.03†
Vaginal operative delivery in the second stage	15 (15)	19 (17)	0.57†
Episiotomy	56 (51)	72 (64)	0.05†
Third or fourth degree tears	7 (6)	9 (8)	0.64†
Epidural analgesia	47 (42)	49 (43)	0.88†
Oxytocin augmentation	69 (63)	74 (66)	0.67†
Characteristics of infants at birth:			
Gestational age in days	280 (8.6)	283 (7.1)	0.04‡
Weight (g)	3514 (391)	3622 (431)	0.05‡
Length (cm)	50.4 (1.9)	50.8 (1.7)	0.11‡
Head circumference (cm)	35.3 (1.4)	35.9 (1.6)	0.002‡

*Log rank test.
†χ^2 test or Fisher's exact test.
‡*t* test.

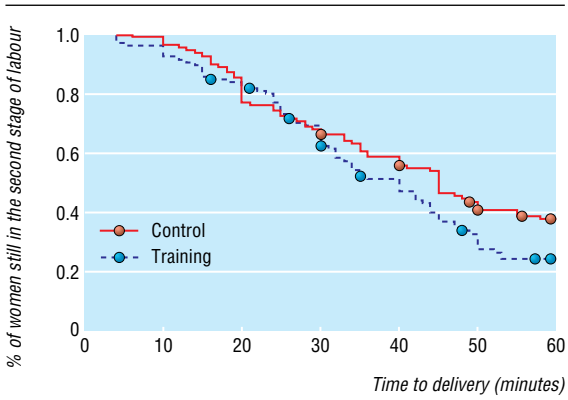

Fig 2 Survival plot of the duration of the second stage of labour for women in the training group (n=105) and the control group (n=109). Discrepancies in numbers are due to some missing data in each group (six in the training group and four in the control group). Operative deliveries for fetal distress (n=9) and slow progress (n=3) during the first hour, and all deliveries lasting longer than 60 minutes (n=59) were censored. Log rank test, P=0.06 for comparison of the two survival plots in the Kaplan Meier analysis

The second stage of labour begins when cervical dilatation is complete and ends with fetal expulsion.[6] We defined the second stage as "active pushing time." This definition of the second stage is suitable for clinical research, since the start of active pushing is easily identified from partograms, and it is related to a second stage rule.[7] The risk for bias should be small since the reviewer of the partograms was blinded to group status.

Chance finding

The difference in breech presentations should be interpreted as a possible chance finding. The women trained in different positions, but there is insufficient evidence from well controlled trials to support the use of postural management of breech presentations.[8]

Role of body mass index or exercise

We found no differences in body mass index or self reported regular physical exercise after the training period (data not shown). This argues for an effect of increased strength and better control of pelvic floor muscles rather than a general effect of physical training during pregnancy. New trials from other populations are needed.

What is already known about this topic

Exercising the pelvic floor muscles prevents urinary incontinence in about one in six women during pregnancy and in one in eight women after pregnancy

It increases the strength of the pelvic floor muscles

What this study adds

Intensive training of the pelvic floor muscles during pregnancy seems to facilitate rather than to obstruct labour.

It prevents a prolonged second stage in one in eight women

Contributors: KÅS and SM were involved in designing and conducting the study, analysing the data, and writing the report. Kari Bø contributed to the design of the study. The physiotherapists Hildegunn Børsting, Trude Hoff Leirvik, Bente Olsen, Monica U Tøndel, and Bjørg Vada led the group training sessions. Pål Romundstad gave statistical advice. KÅS is the guarantor.

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Ethical approval: Regional medical ethics committee.

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